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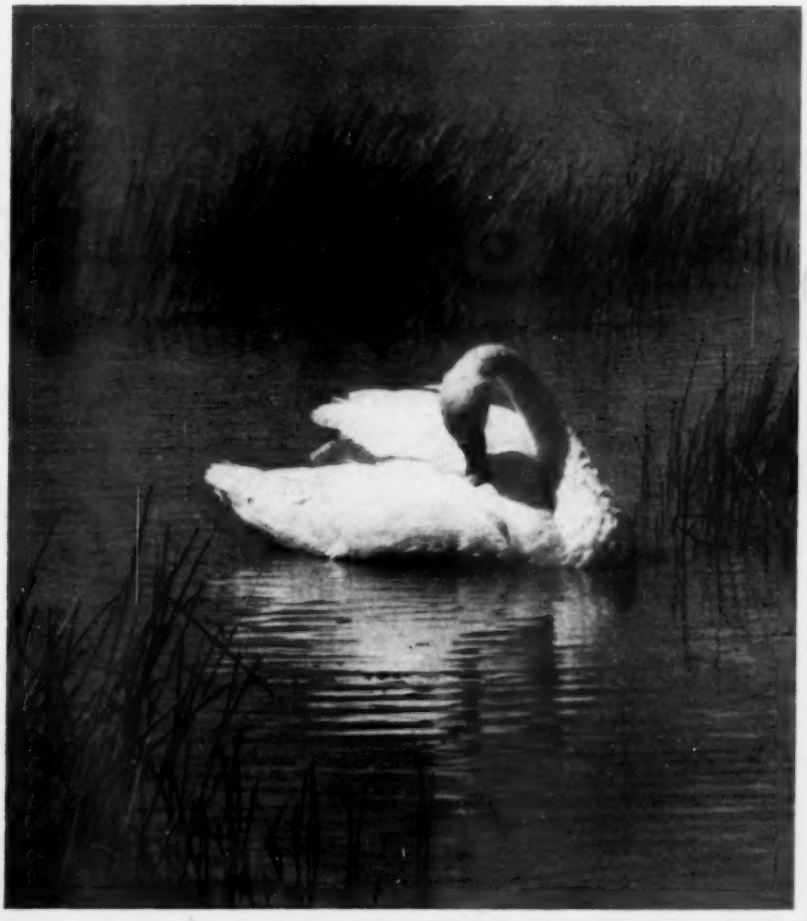

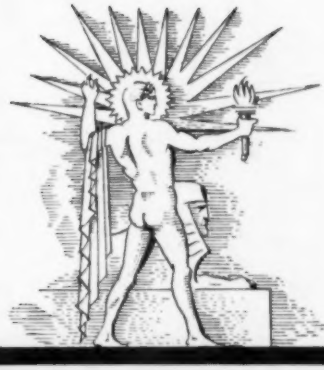

May 11, 1940

Returning Trumpeter

See Page 303

A SCIENCE SERVICE PUBLICATION

Do You Know?

The project of constructing a mammoth *power plant* at Assuan Dam is being intensively studied by the Egyptian government.

To stretch the supplies of *road materials,* highway builders in Manchukuo are laying mere ribbons of concrete, four to a highway.

Home-made revolving beacons are suggested to farmers by government biologists as a device for protecting *crops* from migrating waterfowl.

Quick-frozen foods, properly prepared and stored, show little vitamin and other nutritional losses, says Dr. Mary Swartz Rose of Columbia University.

A map of North America dated 1687 and now in the Metropolitan Museum of Art is believed to be one of the last maps to show California as an *island.*

One advantage of a *windbreak* is to conserve moisture for the field it protects—so agriculturists explain, adding that soil, like Monday's wash, dries faster in a breeze.

A white-petaled *rose* with a red center, brought to England from Tibet in 1924, is now rated as a species new to science, rather than a new variety, as was first thought.

Automobile *engineering* would be 40 years ahead now, says a University of California engineer, if inventors had not been influenced by the idea of horses pulling wagons and therefore put the automobile engine in front.

QUESTIONS DISCUSSED IN THIS ISSUE

Most articles which appear in SCIENCE NEWS LETTER *are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.*

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How many years does it take for Sitka spruce to mature? p. 293.

SURGERY

What new life-saving technique has been developed for amputations? p. 297.

ZOOLOGY

Why are biologists hunting for short-legged coyotes? p. 297.

Most dairy herds give twice as much milk in *spring* as in fall.

Sealing wax is not wax; it is shellac and rosin plus coloring matter.

Four *Chinese children,* two in China and two in Chicago, have helped the Field Museum of Natural History prepare an exhibit showing typical modern Chinese school children.

It takes 28 million hens to lay *eggs* to feed New York City's people.

A *porcupine* will risk almost anything to get salt, as campers have often learned.

St. Louis' *traffic lines,* painted by machine in three narrow white stripes, instead of a wide stripe, are reported to give better visibility and save 25% in paint.

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ANTHROPOLOGY

Great Growth of Human Brain Causes Skull Changes

Cerebral Enlargement Held Responsible for Changes In Size of Face and Teeth as Well as in Cranium

MAN'S evolution as a "brain animal," with a cerebral development that is an outright anatomical runaway, is primarily responsible for all the changes that have taken place in the human skull, Prof. Franz Weidenreich of Peiping Union Medical College told the meeting of the American Association of Physical Anthropologists in New York.

Prof. Weidenreich, leader of research on Peking Man, one of the most ancient of human races, held the extraordinary enlargement of the brain responsible not only for the necessary changes in the case of bone that houses it, but also for the changes in accessory skull structures such as the reduction in size of face and teeth as contrasted with conditions to be found in fossil and living great apes.

Analogous changes have taken place in the skulls of dogs, Prof. Weidenreich declared. Small dogs, like King Charles spaniels, have skulls larger in proportion to the rest of their bodies than are the skulls of big dogs like wolfhounds; and with the relatively larger skull goes reduction in size of face and development of teeth.

"Dogs and man differ," said Prof. Weidenreich, "only in that the brain of dwarf dogs has increased relative to the size of the body, whereas in man the brain is expanded absolutely. Similar relations and differences can be found also in other mammalian groups. These facts prove that the evolution of the special character of the human type is strictly orthogenetic and does not alter the basic pattern which man shares with the anthropoids."

Science News Letter, May 11, 1940

Race Seen as Dynamic

RACE is not something foreordained, fixed and final for all time; it is a "dynamic process of gene variability," constantly undergoing evolution into something new. Such was the view of race presented before the meeting of the American Association of Physical Anthropologists by Prof. M. F. Ashley-Montagu of Hahnemann Medical College, Philadelphia.

Genes, the determining units in heredity, animal and plant as well as human, fix the character of a race at any given time and set its course in further development, Prof. Ashley-Montagu pointed out. And it takes relatively few gene changes to make a racial difference.

"The physical differences existing between the living races of man probably represent the end effects of small gene mutations fitting harmoniously into gene systems which remain relatively unaltered," he said. "The number of genes involved is very small, at the maximum probably no more than 1%, the action of the genes being for the most part independent."

Science News Letter, May 11, 1940

Gargantua is Different

GARGANTUA the Great, much-publicized circus gorilla, is different in blood type from the few other gorillas who have thus far been "typed," Dr. P. B. Candela of Brooklyn reported.

Gargantua is only the fifth gorilla whose blood has been studied. The other four were all of Group A, whereas Gargantua belongs to Group B or Type 3. Previous to this time Group B has been reported only in orang-utans and gibbons.

Science News Letter, May 11, 1940

Head-Hunters' Teeth

FURTHER evidence of the ill effects of civilized contacts upon the teeth of primitive man was reported before the meeting by Dr. Harry B. Wright, Philadelphia dental surgeon.

Dr. Wright studied two groups of Jivaro Indians, head-hunting people of South America. The first group consisted of 67 men who had had practically no contact with the white man and his world; the second, of 80 men who had taken up life around a mission station and had to a certain extent adopted the white man's food.

Tooth troubles were not entirely absent even in the isolated group; 82% of them had turned or overlapped front teeth. There was nothing else wrong with their teeth, however. But of the second group, all but three had many tooth cavities, and there was a high proportion of malocclusions.

Science News Letter, May 11, 1940

MILE-A-MINUTE

That is the climbing speed of this newest interceptor fighter being built for the Allies by the Curtiss-Wright Corporation. It is equipped with four machine guns firing through the propeller disc. In this picture the streamlined cowling over the engine has been raised for inspection.

Race Growing Shorter

BOYS and girls now growing up show a tendency to become less tall than their older brothers and sisters of a few years ago, and also not to become mature men and women at so early an age. Data in support of this contention were submitted to the meeting of the American Association of Physical Anthropologists by Prof. Clarence A. Mills of the University of Cincinnati.

Prof. Mills was inclined to attribute this reversal in the human growth tide to a change in climate toward the warmer, rather than to any differences in the American diet. The tendency for young people of the recent generation to grow tall and mature early, which he said is now reversing itself, has been laid to improved diet. Yet the present generation of college students (on whom the studies have been based) is just as well fed as their taller immediate forebears.

Need for more information, especially from foreign lands, was stressed by the speaker in his concluding remarks:

"It seems likely that a profound racial change is taking place in humanity, physically as well as socially. It would be highly desirable to know whether a similar physical reversal is taking place in those foreign lands where the upward surge of the last half century has been most marked."

Science News Letter, May 11, 1940

"Man-Apes" Contemporary

RE-STUDY of the fossil ape skulls and teeth found in South Africa by Dr. Robert Broom of the Transvaal Museum in 1936 was reported in an illustrated lecture by Drs. William K. Gregory and Milo Hellman of the American Museum of Natural History. Their findings confirm those of Dr. Broom: that the canine teeth of these apes are almost human, while the large molars combine human and ape features.

"Our reconstruction of the upper dental arch comes out in almost human form," Dr. Gregory stated. "The lower teeth also combine ape and human characters.

"These creatures probably represent persistent primitive forms that lived on in South Africa after man himself had arisen, possibly in another part of the world."

Science News Letter, May 11, 1940

Hopewell Indians Described

THE INDIANS who built the famous Hopewell mounds of the Ohio valley, and whose cultural remains have been found as far west as Iowa and Missouri, were brought a little closer to personal portraiture by a paper presented before the meeting of the American Association of Physical Anthropologists, by Dr. T. D. Stewart of the U. S. National Museum.

Trouble with the Hopewellians is that they practised cremation, so that bones found in their elaborate funeral mounds have always been burned beyond any possibility of reconstruction. Therefore while scientists have been able to collect great amounts of data on their really beautiful workmanship in copper, shell, mica, obsidian, horn, bone and river pearls, they could never get an idea of what the people themselves looked like.

However, some skulls from a Hopewell site near Kansas City, Mo., excavated by Dr. W. R. Wedel of the National Museum, at last give a clue to the Hopewellians' personal appearance. Search in the Museum's great collection of Indian skulls has also brought to light specimens from the Illinois-Wisconsin-Iowa region, which had hitherto been overlooked.

The typical Hopewellian skull appears to have been long and narrow—in Europe it might have been classified as either Nordic or Mediterranean. Similar skulls were common among more recent Indian tribes in eastern North America. There is also a pronounced narrowing of the forehead, which Dr. Stewart believes may have been artificially produced by binding of the heads of the young children. Head binding is common practise in many Indian tribes, though it is usually done in such a way as to cause a flattening instead of a narrowing of the skull.

Science News Letter, May 11, 1940

Early Skull Surgery

EVIDENCE that Indians who once lived near Washington, D. C., practised the skull-piercing surgery that was common in ancient Inca-land was offered in another paper presented by Dr. Stewart. A skull dug up by Mrs. Alice L. L. Ferguson on her property on the Maryland side of the Potomac opposite Mount Vernon has a triangular hole in it, the sharp edges bevelled inward. The bone had healed perfectly.

The find is a very puzzling one, because primitive trepanning has not hitherto been known for this part of the continent. Yet the job was so skillfully done that "it would seem unreasonable to expect such a successful end result on a first attempt at cranial surgery."

Science News Letter, May 11, 1940

PHYSICS

Ice Melts Without Heat In World of Thin Films

AMAZING things happen in the strange two-dimensional world of thin films which scientists can create in their laboratories. Typical is a new kind of "ice" which requires no heat to melt it, and turn it from a solid to a liquid state.

However, an extremely large amount of heat is used to expand or swell the liquid whose molecules separate sufficiently so that if this occurred in three dimensions it would be as if one quart of milk were to expand to three quarts, and yet remain liquid.

Prof. William D. Harkins, T. Fraser Young and Edward Boyd of the University of Chicago told of this new discovery to the National Academy of Sciences.

Every farmer knows that the way to keep potatoes in the vegetable house

MEASURES THIN FILMS

Prof. William D. Harkins and Dr. R. J. Myers are shown here with their apparatus for studying thin oil films only one molecule thick. Pressure, temperature and molecular area are measured and from these heat of expansion can be calculated.

from freezing during the winter is to keep tubs of water around. On cold nights this water freezes but in so doing liberates a large amount of what is called "latent" heat. Ice, in other words, gives up heat when it forms and requires heat to melt it, a fact which enables refrigerators to create cold.

In Prof. Harkins' thin film experiments many of the ordinary rules of heat and cold seem to be non-existent, but actually the same laws hold, though greatly disguised. Using an organic substance called pentadecylic acid it was found that when the molecules in the thin film are far apart the material exists as a gas in two dimensions only.

On compression, Prof. Harkins reported, this two-dimensional gas begins to change into a two-dimensional liquid. If this liquid is further reduced in area a second and remarkable type of liquid is created. This liquid is at first highly compressible, then becomes quite incompressible as the pressure is increased.

Finally, as the area is greatly reduced, the second kind of liquid shrinks and the liquid film freezes, but it is remarkable freezing in which no latent heat is evolved. "Thus," says Prof. Harkins, "a kind of 'ice' is formed which requires no heat to melt it."

The thin films which Prof. Harkins and his group have been studying have only two dimensions—length and width. The thickness is only that of a single molecule, that is, a fifty-millionth to a ten-millionth of an inch. These thin films have remarkable departures from the behavior of ordinary three-dimensional matter. (1) No heat is required to melt the solid. (2) Very little heat is required to expand the first type of liquid as long as its molecules stay packed about as tightly together as in three dimensions. (3) There then ensues an expansion of this liquid film such that the intermolecular distance may increase as much as 35%.

This expansion occurs without a change of state, but nevertheless the heat absorbed is very great. For example, if the film consists of pentadecylic acid this extension of the film absorbs as much heat as it used in the evaporation of the same number of molecules of water at ordinary temperatures (11,000 calories per mole).

Science News Letter, May 11, 1940

● RADIO

Dr. Alexander Wetmore, assistant secretary of the Smithsonian Institution, and secretary general of the Eighth American Scientific Congress will interview eminent Latin American scientists who are participating in the Congress as guests on "Adventures in Science" with Watson Davis, director of Science Service, over the coast to coast network of the Columbia Broadcasting System, Thursday, May 16, 4:45 p.m., EDST, 3:45 EST, 2:45 CST, 1:45 MST, 12:45 PST.

Listen in on your local station. Listen in each Thursday.

RESOURCES

War's Demands for Wood Wreaking Havoc In Canada

Toll of Timber Increased by Fact That Less Than 7% Of Sitka Spruce Cut Is Suitable for Aircraft Work

WORLD War II is taking a heavy toll of the Pacific Northwest's famous but almost irreplaceable tall timber, one of the last stands of big trees in the world, conservationists in Vancouver and in Seattle declare.

Cutting of Sitka spruce, the 250-foot forest monarch whose best cuts go into military training planes, is up about 50% since the declaration of war, a British Columbia Forest Service official estimated. The available supply of virgin spruce will last less than 40 years at the present rate of cutting, instead of the 50 years the pre-war cutting rate would have allowed.

The take of Douglas fir, best Pacific coast lumber tree and one of the finest in the world, is such that virgin stands of this species of fir will not last more than 15 years. Production is temporarily off because of a shipping shortage, but once the shipping difficulties are solved (and they will be), the rate of cutting will exceed that of 1939, which exceeded 1938.

In not too many years the familiar barge loads of Douglas fir "peeler logs" from the Pacific coast islands will be a sight of the past. The 12-foot long, stout "peeler logs," cut from the butt of the tree, are top grade lumber.

Tragedy of both Sitka spruce and Douglas fir is that neither achieves its outstanding qualities of strength in much less than 250 years. This slow period of growth, combined with a peculiar system of timberland holding in effect in British Columbia, makes forest "harvesting"—in which the annual cut is limited to the annual growth—appear an impractical dream for these two trees.

Timberlands are not owned outright, but revert to the government when the timber has been cut. The right-holder must pay an annual tax of $140 a square mile as long as the land is not cut and he holds it. He would need rights on simply immense areas to get any harvest at all from such slow-maturing trees. At $140 per section per year, this is not economically feasible. Instead, the timber baron "cuts out and gets out."

Sitka spruce is the victim of still another circumstance. Only between 2% and 7% of the cut yields lumber suitable for aircraft work. Much of the rest is highly useful, but Sitka spruce pulp at the moment is a drug on the market. And in many of its other uses, it could be replaced by a less-threatened wood.

The situation is comparable to killing herds of steers merely to get the filet mignon. The logger can't tell which will be the filet mignon parts while the tree is still on the hoof.

The main remaining stands of virgin Sitka spruce are on Vancouver and Queen Charlotte Islands and in the valley of the mighty Fraser River, which roars through British Columbia into Georgia Strait just south of Vancouver. Sitka spruce stands in the United States are still smaller.

The events in Scandinavia have not markedly affected the demand for coast lumber, as Scandinavia produces mostly pulp. This is lumber country.

The government reforestation program in British Columbia will have put 20,000,000 Douglas firs and also Sitka spruce into the ground. But none of us will be around to see them soar majestically heavenward, almost perfectly straight all the way up and with the first hundred feet of trunk clear of branches. Large forest areas in British Columbia remain untapped but they too will be cut over in time.

Only a changing technology, which is substituting plastic cellulose products for lumber, and thus permitting the wider use of faster-growing trees like cedar and hemlock, will protect 100,000 wage earners in the Oregon-Washington-British Columbia area from loss of their forest source of livelihood. Cedar and hemlock have always bulked large in this region's forestry. They will bulk larger as time goes and the big trees grow fewer.

Science News Letter, May 11, 1940

PHYSICS

Music in Three Dimensions

Thrill of Great Symphonic Orchestra With All Its Depth and Breadth Is Now Brought to Empty Stage

By WATSON DAVIS

THE emotion-stirring quality of a great symphonic orchestra or the vibrance of an operatic or stage presentation can now be presented to a theater audience even though the stage be empty and the artists, musicians and conductors long since finished with their tasks.

Into the world of sound there has come a new perfection of sound transmission and recording, born of the telephone, phonograph and sound movies yet so different in quality and purpose as to constitute a new entertainment art.

Not many nights ago a distinguished audience in Carnegie Hall, New York, was entertained with that latest perfection of musical sound, stereophonic music. If you had been out front at that performance, if you had closed your eyes in the enjoyment of the music as one sometimes does at a symphony, you would not have known that there was no actual orchestra or choir before you on the stage, that the only persons back stage were the engineers running the sound film through their sound reproducing apparatus. You would have felt confident that the kettle drum was booming there, the violins were singing there.

3-Dimensional Sound

It was music with perspective, three-dimensional sound, with depth and breadth, the same kind of sound that issues from an actual symphony orchestra or a great choir present in person, or actors on the stage before you.

A more complex perfection of the sound that issues from your telephone, phonograph or radio, stereophonic sound achieves its illusion of reality by delivering to your ears the sort of sounds they would hear at a flesh-and-blood performance.

Instead of being limited in vibration range as are most of the electrically transmitted and reproduced sounds in practical use, the electrical system used has only the practical limit set by the range of the human ear which is from about 30 vibrations per second to about 15,000.

This makes possible reproduction of the full richness of music, which is far more than the tones which carry the melody. There are overtones as well, and they extend several octaves above the highest note of any instrument. In volume, the stereophonic music runs the gamut of sounds from those just audible to an acute ear, up to those which begin to be painful.

Scientists have divided this volume range into 120 units, called "decibels." Below 20 decibels, casual noises in an auditorium will mask the music. Beyond 120 decibels, sound is too loud for comfort. Due to the limitations of its instruments, a symphony orchestra will leave unused the 10 decibels of greatest volume and also the 10 decibels of least volume.

Can Touch Up Masterpieces

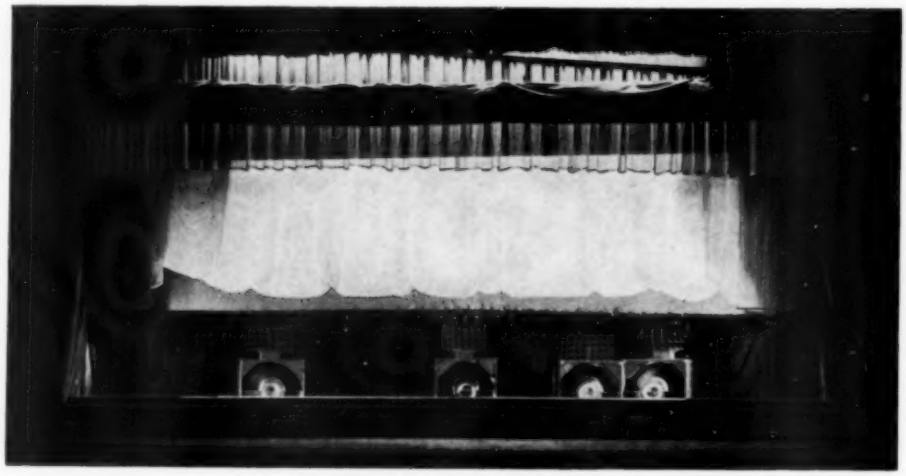
With electrical recording and reproduction of the new sort, a conductor can refine the product of his orchestra, changing its volume synthetically, making its music louder or softer than it was actually played. Great musicians who use baton or fingertips to manipulate the outpourings of great aggregations of fellow musicians have the opportunity of touching up their musical masterpieces in much the same way that a beautiful woman will enhance her charms before her boudoir mirror.

To this breadth of tonal quality and this desirable synthetic modification of the actual performance, stereophonic music adds the illusion that the music and the other sounds come not from one location, but from the whole stage. This perspective or breadth of sound is obtained by actually using three completely independent sound systems, one of which picks up and reproduces what is heard on the right of the stage, one for the center and one for the left of the stage. Sound engineers have found that three such sound systems are adequate for producing a satisfactory illusion of the real performance.

Research for 20 Years

For the last 20 years engineers of the Bell Telephone Laboratories, birthplace of improvements on the telephone, cradle of sound motion pictures, have worked in cooperation with musicians to produce faithful recreations of music. These researches have been led by Dr. Harvey Fletcher. More than 60 years ago music was first transmitted and recorded. But its electrical preservation and reproduction in a satisfactory manner is a development of the past few years.

Electrically cut phonograph records came in 1924; the first commercial sound pictures date from 1926. In a historic demonstration before the National Academy of Sciences in Washington in 1933,



LONG DISTANCE SYMPHONIES

With the aid of the new stereophonic reproduction of sound, an empty stage like this one with only loud speakers upon it can give a replica of the finest performance of the world's best symphony orchestra. Each loud speaker delivers the tones originally generated by different sections of the orchestra in its initial performance.

RETOUCHING MUSIC

Leopold Stokowski, noted orchestra conductor (center), enhances a symphonic production by electrical means, while Dr. Harvey Fletcher of the Bell Telephone Laboratories (left) looks on and W. B. Snow monitors the electrical currents.

stereophonic music of the Philadelphia Symphony Orchestra was transmitted over telephone wires from Philadelphia.

Two years later Leopold Stokowski used stereophonic reinforcement of his music in order to allow 25,000 people in the open air to hear with ease a program of vocal and instrumental music. This year's stereophonic accomplishment by the Bell Telephone engineers results in there being captured upon motion picture film the faithful record of whatever is presented to an audience: music, drama, speech.

A 2,000-foot reel of motion picture film will hold 22 minutes of recording, enough for nearly any single piece of music. On the same film are impressed photographically the sounds picked up by the three microphones, translated into electricity, then amplified and converted into light by a photoelectric cell as a trace of variable widths on the film, much as is done in sound motion pictures.

Two Refinements Possible

There are two refinements in stereophonic recording not used in ordinary sound pictures. The sound records on film have a limited range of volume. It was therefore necessary for the engineers to reduce the louder sounds before recording and to increase those sounds by a like amount in reproduction.

For this reason before the sound reaches the device that modulates the light which shines on the film, the sound current is measured automatically and instantaneously. Whenever this sound current exceeds a predetermined amount, it is reduced so that the recording current never exceeds a certain level. At the same time that measurement of the sound current is made, an alternating current is recorded on the same film and the amount of this current is proportional to the reduction that it is necessary to make in the sound. In reproduction these control currents are used to vary the amplification of the sound currents so that the sound regains its original volume.

Can Modify Recordings

Whenever a conductor like Stokowski wishes to refine or modify or "gild" a recording of his orchestra from the standpoint of volume of sound, this can be done without reassembling the orchestra and repeating the performance. The engineers arrange a performance with the conductor as audience. As he listens he makes volume and even tonal changes by electrical control. Simultaneously a new stereophonic record is made of the music as thus "enhanced." This is the record which would go before the audience.

How stereophonic recording will be used in the future is not yet decided. Symphonic music could be taken to much smaller audiences and smaller communities that cannot now afford to maintain or import a symphony orchestra. The audience would have to gather in an auditorium in order to listen to the music just as they do in the case of a symphonic concert with live talent. The illusion of sound perspective cannot be obtained in a small room or over the radio.

The combination of stereophonic recording with motion pictures is another possibility. Motion pictures are now available in color. When invention progresses to the point where motion pictures can practically be made three dimensional or stereoscopic, in addition to color being presented to the eye and stereophonic music to the ear, the recreation of a concert or stage performance—or even the recreation of a historical occasion—may come to practical reality.

Science News Letter, May 11, 1940

ECONOMICS—POPULATION

How Large Families Make Ends Meet

THE MORE children there are in a family in the United States nowadays, the larger is the part of the budget spent for food, and, by irony of fate, the lower goes the nutritional level.

So the Population Association of America was told at its meeting in Chapel Hill by Prof. Frank Lorimer of the American University, who reported an investigation of the economic problems of families of varying sizes.

As the urgency of eating to live presses more intensively on budgets of families with more children, these families meet the food problem by curtailing their spendings on such things notably as house furnishings, equipment, and transportation, recent analysis shows.

In United States cities, recent figures indicate that over 60% of families with five or six children, and over 90% of families with seven, eight, or nine children under sixteen years of age are in the lowest income classes.

From the standpoint of population policy, concerned with equalizing the economic situation of varying-sized families, one baffling problem is that the larger the family, the smaller the earnings of a working wife, Prof. Lorimer pointed out.

There is a strong tendency in contemporary society for many women to continue working after marriage, so long as there are no children in the family, but to drop employment and thus sacrifice the economic contribution as they become mothers, he stated.

In Negro families, the high proportion of working wives is attributed to poverty resulting from meager earnings of men, he has concluded from evidence that the proportion of Negro wives who work drops sharply when husbands' earnings rise above $1,000 a year.

Science News Letter, May 11, 1940

RADIO

Forecast Radio Waves To Be Most Useful

SUCCESSFUL forecasting three months in advance of the best frequencies for use in dependable radio transmission has been achieved by the National Bureau of Standards, Dr. J. H. Dellinger and N. Smith, two of the government's radio experts, announced to the meeting of the International Scientific Radio Union and the Institute of Radio Engineers in Washington.

The monthly predictions are published as graphs showing the maximum usable frequencies for radio waves reflected by the ionized layers, many miles high in the earth's atmosphere.

To radio engineers such predictions are useful because they allow them to plan what communication channels to use.

When the predictions were begun a year ago, the scientists expected that they would be accurate within 15% and better than this fulfillment has been achieved. The predictions are based on the 11-year sunspot cycle.

Science News Letter, May 11, 1940

MEDICINE

Community in Fight Against Pneumonia

BECAUSE the discovery of sulfapyridine treatment for pneumonia has made possible the saving of many more lives than ever before does not mean that communities can let up in their fight against this disease. On the contrary, it is the signal for a bigger push than ever against this former "Captain of the Men of Death."

Many people hearing about the success of chemical treatment of pneumonia probably have the idea that the pneumonia fight has been reduced to the simple level of the doctor calling on the patient, announcing a diagnosis of pneumonia, and ordering the nearest drug store to send in a supply of sulfapyridine pills.

Such is not the case. Laboratory facilities for diagnosis of the type of pneumonia are still needed. Some patients still need specific anti-serum, and some patients need a combination of the two. When sulfapyridine is given, blood and urine examinations need to be made and the concentration of the chemical in the blood must be determined as safeguard against occasional serious toxic effects of the chemical.

The role of the community in the fight against pneumonia is summed up by Drs. Frederick T. Lord, of Harvard Medical School, and Elliott S. Robinson and Roderick Heffron, of the Massachusetts Department of Public Health, in their new book for doctors, Chemotherapy and Serum Therapy of Pneumonia (The Commonwealth Fund). Besides pointing out specific duties of the community, they state:

"The general use of this drug (sulfapyridine) and of specific anti-serum in the treatment of pneumococcus pneumonia presents a special and nation-wide problem, which requires for its solution more equitable distribution of funds, better organization of local forces, and greater familiarity with technical matters that are everywhere at hand."

Science News Letter, May 11, 1940

GEOLOGY

Japanese Pursue Gold Hunt In Island of Formosa

HOPING for vast treasures of gold which Japan could use to replenish her weakened reserve, officials in Taiwan (Formosa) are eager to expand exploratory probing of deep gorges of the colony's east coast.

Some 104 terraces in five rivers are believed to contain gold; and borings to date have apparently convinced the authorities that real wealth is hidden within, says a consular report received by the U. S. Department of Commerce.

Formosa's gold hunt started last October, when a Japanese government mining engineer sought to test his theory that relatively small gold findings in the region were washed down from terraces in steep mountain gorges, probably richly stocked with hidden ore.

While reports and rumors of gold since located in terraces in this remote district have run to fantastic-sounding figures, and have met with some skepticism, the Japanese Government was sufficiently impressed by its information to send mining and geological experts to the scene. Their public statements were cautious, but hopeful. Since then, governmental officials have asked more than a million dollars in appropriation to push the gold hunt.

According to one report from the region, placer deposits in one terrace would indicate reserves in that terrace alone amounting to more than $37,000,000 value. Such estimates, if fulfilled by actual mining development, would mean that Formosa's gold would far exceed wealth of the American Klondike.

Science News Letter, May 11, 1940

IN SCIENCE

BOTANY

500 Species of Plants Live by Eating Meat

ALL animals exist by eating plants directly or indirectly. That is not exactly news. But when plants eat animals that's likely to be as much news as a man biting a dog.

There are nearly 500 species of carnivores in the plant kingdom—insect-eating plants. Many of them are overlooked because of their small size. They have almost world-wide distribution although they occur in greatest numbers in moist tropical regions.

Carnivorous plants to a large extent get their nourishment from the soil and air just as ordinary plants do but it is believed by some that these plants, growing mainly in peat bogs where there is a lack of nitrogenous nourishment, may be aided to survive under such conditions by their accessory meat diet.

Belonging to a half-dozen different plant families, their methods of trapping allow them to be divided into three general groups, on the authority of the Brooklyn Botanic Garden. Sticky substances hold the prey fast without noticeable movement of the leaves as in the butterwort. Leaves constructed like a lobster trap or an old-fashioned wire rat-trap catch insects in the bladderworts and the pitcher-plants. Captured animals, as in the sundew and Venus's flytrap, produce irritation which sets tentacles or other moving parts in motion to hold the prey by force. You should be able to find animal-eating plants on your walks in the country during coming months.

Science News Letter, May 11, 1940

MEDICINE

Benzedrine Sulfate Use May Lead to Addiction

SPECTACULAR as the effects of amphetamine sulfate (benzedrine sulfate) may be as a "pepper-upper" and in the treatment of obesity, it has among other dangers, that of producing addiction with deleterious results from long continued use, warns Dr. Sidney Friedenberg of Camden, N. J. (*Journal American Medical Association*, March 16)

Science News Letter, May 11, 1940

NCE FIELDS

GENERAL SCIENCE

Scientific Books Wanted For China's Students

AMERICAN scientists who have books and reprints to spare are now urged to send some to China, to help thousands of students and research workers trying to "carry on" there without books.

"Owing to our hurried departure from Nanking, more than 200,000 volumes fell into the hands of the Japanese, who set them, together with the valuable collections of other institutions, on fire," says a statement from Chiang Fu-tsung, librarian of the National Central Library.

The plea for donations of science publications is brought to attention of American scientists by Prof. George W. Hunter, III, of Wesleyan University, in a note to the journal, *Science*. (April 26)

The National Central Library, with such books as escaped destruction, has moved from Nanking to Chungking, provisional capital of the Chinese republic. From there, the library aids scientific workers throughout the republic by a mail system of lending books. Publications, it is said, may be sent to Chungking by book post via Haiphong, French Indo-China.

Science News Letter, May 11, 1940

PSYCHOLOGY—SOCIOLOGY

America Must Plan To Avoid Fascism

AMERICA's protection against regimentation, master planning, and the pushing around of dictatorship lies, paradoxically, in planning.

"To avoid fascism," declares Dr. Leonard W. Doob, Yale University psychologist, "there must be planning against fascism and for the better life."

Unemployment, soil erosion, forest and game depletion, poverty and crime are among many national problems which seem to demand a unified national campaign for self-defense.

But individuals, when master plans are considered for meeting such emergencies, may see them as steps toward dictatorship, goosestepping, and blackout of individual freedom.

We may like single reforms, the new murals in the local library, or the local sewerage system, but may fear the general trend of such reforms.

To stop all planning is not the way out of such a dilemma, warns Dr. Doob in a new book, "The Plans of Men."

The answer, as Dr. Doob sees it, lies instead in better plans, attuned closely to the needs and desires of living men and women.

"If centralization and master planning are to be avoided," he declares, "then other plans must be formulated and executed successfully in smaller regions." Through education, individuals must develop "planning personalities."

Perhaps a logical next step to Dr. Doob's proposal is that instead of the imposition of dictatorial master plans, there should be established an effective general coordination of the thousands of individual and group plans made by men and women for solving their own problems, gradually and continually modified, expanded and improved by the original makers in the light of common experience.

Science News Letter, May 11, 1940

SURGERY

New Technic in Amputation To Prevent Deaths

A NEW life-saving technic has been added to one of the oldest of surgical procedures, amputation of a leg. Details of the technic with successful results in 28 consecutive amputations of the thigh are reported by Dr. J. Ross Veal, Gallinger Municipal Hospital, Washington, D. C. (*Journal, American Medical Association,* April 27).

When death follows amputation of a leg for vascular gangrene in patients with arteriosclerosis, diabetes and thrombo-angiitis obliterans, as it does in about one-third of the cases according to Dr. Veal's figures, lung complications are the most important cause of the deaths.

These are due not so much to infection, Dr. Veal found, as to tiny blood clots torn loose from a large clot at the end of the femoral vein in the stump left after amputation. The little blood clots are swept along the blood stream to the lungs where they become lodged and cause the fatal complication.

To avoid this, Dr. Veal, before amputation, ties off the femoral vein high enough so that a moving stream of blood from large tributary veins can prevent the formation of a dangerous clot in the femoral vein.

Science News Letter, May 11, 1940

ZOOLOGY

Biologists Are Hunting For Short-Legged Coyotes

A CALIFORNIA coyote has biologists excited although he is now only a museum specimen in the University of California Museum of Vertebrate Zoology. He has all four legs only about two-thirds the length of normal coyote legs and foot bones correspondingly short. Dr. E. Raymond Hall suggests that this change may have been brought about by a sudden mutation, a new factor introduced into the chromosomes that gave rise to the animal. Such a hereditary freak produced the famous Ancon breed of sheep in the latter part of the eighteenth century on a New England farm. Hope of the biologists is that this male "bench-legged" coyote, an adult, sired a litter before he was caught in the Lebec region of Kern County by Jack Sawyer, state trooper. A search will be started for other animals of what may be a new short-legged breed of coyote.

Science News Letter, May 11, 1940

ENGINEERING

Army Now Has Experimental Diesel-Powered Scout Cars

TWO new experimental diesel-powered scout cars for Uncle Sam's cavalry-on-wheels have rolled out of the shops and will take part in coming big maneuvers in the South, along with present-type gasoline-driven vehicles. Armored, they carry eight men each, with machine guns. Advantages: fuel economy, with greater cruising radius; no interference with radio sending and receiving, because no electric spark ignition used in diesels.

Science News Letter, May 11, 1940

ORNITHOLOGY

Find Heron with One Wing Growing Upside Down

A BIRD with one wing growing upside down is the prize exhibition at the Trailside Museums, Bear Mountain Park, N. Y. The left wing of this young black-crowned night heron had been broken in some manner, preventing the bird from flying. Wing bones had healed perfectly except that the wing was reversed in position. Discovered by 17-year-old Stanley O. Grierson of Katonah, N. Y., the upside-down-wing heron must be fed at least 100 small fish every day.

Science News Letter, May 11, 1940

PSYCHIATRY—MEDICINE

Oxygen Reported to Bring Mentally Ill Back to Reality

MENTALLY sick patients may be brought back to the world of reality by a new treatment developed from submarine and deep-sea diving investigations. Oxygen may produce the sanity-restoring shock now accomplished in some cases by insulin, metrazol or nitrogen, Lieut. Albert R. Behnke, U. S. Navy surgeon, told the American College of Physicians in Cleveland.

Victims of heart disease and of sinus trouble may also be helped, Lieut. Behnke said, by applying what naval authorities have learned about the effects of oxygen, other gases, and pressure on the human body.

For heart disease patients oxygen treatment might be much more widely used than it now is, he said. For the sinus sufferers, he recommended positive pressure, like a trip under water in a submarine. Small pressure chambers to achieve the effect in the nose-and-throat specialist's office might be used. Suction, used in an attempt to make breathing through stuffy noses easier, has done much harm, he believes. Instead, he advises positive pressure up to 10 pounds per square inch in the pressure chamber, followed by subsequent release of the pressure. This would provide effective ventilation and drainage with minimum injury to nasal tissues.

Physical fitness can also be measured in the pressure chamber. Such a test used in the Navy showed that only 10 to 15% of qualified submarine personnel could not tolerate pressures of two or more pounds per square inch. Among civilians, only about 50% can pass this pressure test.

Science News Letter, May 11, 1940

MEDICINE

Sex Hormone Treatment May Speed Bone Knitting

KNITTING of broken bones, especially in elderly women, may be speeded by treatment with the female sex hormone, theelin, Dr. G. A. Pollock, of the Mayo Foundation, declared as a result of studies of the effects of theelin on broken bones in laboratory animals.

Women over 60 years of age get so-called "broken hips" with "striking" frequency, Dr. Pollock pointed out. The condition, although popularly known as a "broken hip," is actually not a break of the hip but of the neck of the thigh bone near where it is joined to the hip.

Of 23 persons with this kind of fracture who were of comparable age, 22 were women in the series Dr. Pollock studied. This fact plus others showing a change in the bones of older women suggested a relation to the cessation of ovarian function in women past 50 years. Several other scientists, Dr. Pollock found, had also noted a relation between female sex hormones and bone formation.

Theelin, the female sex hormone, was given to elderly female rats and to females from which the sex glands had been removed, and the healing of broken bones compared in these groups with the healing of bones in similar animals that got no theelin and in young animals that were producing their own sex hormone and other young rats given doses of theelin. The broken bones knit faster and in more cases in the sex-hormone treated groups than in the non-treated groups.

The number of animals in the study was small, Dr. Pollock pointed out, and more work will be needed before the findings can be permanently established.

"However," he said, "the results which followed the administration of theelin are sufficiently striking to justify publication of the preliminary report as well as to indicate that ovarian secretion appears to influence calcification and, in the case of fractures, may accelerate solid union."

Science News Letter, May 11, 1940

ARCHAEOLOGY

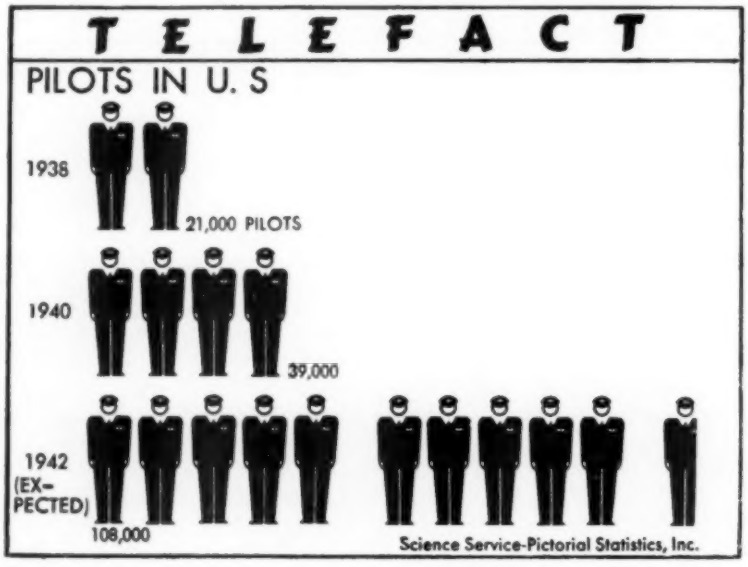
Doubts Rome Found Economic Bluebird

THE HAPPIEST era the world has ever known!

There flies an economic Bluebird of happiness worth hunting in this harried age. And no less an historian than Gibbon has given a clew where to look. People under rule of the Antonine emperors of Rome in the second century A.D. were the happiest, he declared.

But the economic historian, Prof. Tenney Frank, who recently completed his fifth and last volume of "An Economic Survey of Ancient Rome," found weak support for this lofty reputation of contented millions.

Rome was wealthy. Ruins of more handsome buildings on Italian estates are known from this era probably than from any other. Gentlemen farmers had money to spend on hunting lodges, studs



and pleasure parks. The government lulled its citizens into accepting everything, by a benevolent despotism. Slavery for a portion of the people was taken as a matter of course.

Looking closer, Prof. Frank gained the impression of a nation going to sleep. No new ideas, not a single vital product of literature, no art except borrowings, no industrial leadership disturbed the lethargy of this strange "Golden Age" of Rome!

Economic decay, which actually was setting in, was preceded, it appears, by an earlier era of really prosperous farming.

Monumental as Prof. Frank's five-volume work is, such a study of Rome's lengthy economic experience leaves a good many questions unanswered. The data known from the past are still—and may always be—tantalizingly incomplete. Prof. Frank himself said that he dared not guess the cause of Rome's oncoming atrophy. He added: "If we knew the real meaning of the Antonine period, perhaps we should find a formula of some value for our own future."

Science News Letter, May 11, 1940

ENGINEERING

Electrical "Thunder Screen" Brings Sounds To The Theater

All Varieties of Crashes Except High-Pitched Ones Can Be Duplicated with New Compact Device

A PIECE of common window screening, an old-fashioned radio loud speaker, and electric circuits have brought to the sound effects repertoire of the theater new thrills for the ear, Prof. Harold Burris-Meyer of Stevens Institute of Technology told the meeting of the Acoustical Society of America in Washington.

The new screen, compact and light in weight, replaces the huge "thunder drums" which have been a cumbersome prop of the theater for many a year. These thunder drums are great pieces of raw hide, five feet on a side, stretched in a heavy wooden frame. An hour or more before a performance this raw hide had to be heated by powerful lamps or electric heaters so that it would become taut and vibrate with the roll of distant thunder.

Vincent Mallory, research consultant working with Prof. Burris-Meyer in the design and construction of acoustical apparatus for the theater, said in an interview that the little "thunder screen" which has been developed can produce a great variety of sounds as the operator becomes skilled in its use.

Sounds of machine gun fire come out of it by slowly drawing a stylus across the screen with the proper tempo. A rapid motion by the stylus produces a ripping, tearing sound like the tearing of heavy fabric—an airplane wing covering or a heavy sail.

Sounds of cannon shot are produced by the device if it is struck with a covered mallet, and only the first part of the vibration picked up electrically with the rest of the vibration cut off. In contrast, distant thunder is produced by striking the screen and then, by volume control, amplifying and controlling the continuing, damped vibrations.

All varieties of crash noises can be duplicated, Mr. Mallory said, except very high pitched crashes. For this reason the device cannot duplicate the breaking of glass with its high-pitched tinkle.

In operation, the thunder screen is simple. The screen wire is mounted vertically and connected by a rigid wire directly on to the movable part of an old electromagnet type of loud speaker. As the screen is scratched, or struck, its vibrations are conveyed to the electromagnet and converted into electrical pulses that can be sent through circuits to whatever loud speakers in the theater are to be used.

Elaborate control techniques and the trick of chopping out whole octaves of the sounds which are created can produce amazingly dramatic sounds. The emphasis at Stevens, Mr. Mallory said, has been to strive for the maximum emotional effect of sounds. In one recent play loud speakers were rigidly mounted to the floor of the auditorium and on loud amplified sounds the feet of the audience could actually "feel" the vibrations. Two members of the audience unexpectedly became somewhat ill from this unique and novel use of acoustics to augment the drama.

Science News Letter, May 11, 1940

PLANT PATHOLOGY

Virus Disease Transmitted Along with Bud Grafts

A SERIOUS leaf disease that has been making trouble for growers of Italian prunes in the Northwest has been traced to a virus origin by Dr. Earle C. Blodgett of the University of Idaho. When new trees are produced by bud-grafting, the disease goes right along in the buds. Greater care in the selection of healthy buds for grafting should result in a reduction of losses.

Symptoms, appearing early in summer, include numerous spots on the leaves, which in more serious development die through and become shot-holes. Sometimes trees are defoliated. In any case, such reduction in food-making areas of the trees results in reduction of the crop. Economic seriousness of the disease is stressed by the fact that in Idaho alone the prune crop averages 20,000 tons a year.

Dr. Blodgett reports his studies in the current issue of *Phytopathology*, official journal of scientists who specialize in the study of plant diseases.

Science News Letter, May 11, 1940

Scientists report that wild *geese* have no single leader to a flock, but take turns leading the flight.

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PUBLIC HEALTH

Malaria-Carrying Mosquito Now Being Battled in Brazil

African Insect, First Found in South America in 1930, Now Infests Some 12,000 Square Miles of Territory

A DETERMINED defense against a foreign invader, dreaded malaria-spreading gambiae mosquitoes, more to be feared than yellow fever, is being waged in Brazil with American support, Dr. Raymond B. Fosdick, president of the Rockefeller Foundation, announced in his annual report.

This African insect, first discovered in South America in 1930, now infests 12,000 square miles of territory. It is declared to threaten all American countries, the United States included, with a catastrophe in comparison with which ordinary pestilence, conflagration and war are but small and temporary calamities. Even penetration of yellow fever into the Orient might be a lesser evil.

The malaria-carrying mosquito was pushed back in 1939, although some 114,000 people were treated for the disease. Two thousand doctors, technicians, scouts, inspectors, guards and laborers were used in the campaign. The mosquitoes were pushed back to their central strongholds in the main river valleys and on the narrow coastal shelf. If held there during the coming rainy season, eventual eradication of the mosquitoes from the whole region may be attempted.

"The plans of the campaign against gambiae sound like the plans of an army on defense," Dr. Fosdick explained. "The frontiers of the infested region are defined by fumigation posts on all the outgoing roads. These are the forts of this new kind of Maginot Line.

"A 10-mile zone beyond the gambiae's farthest limit of advance is to be kept non-infectible, which from the mosquito's point of view is the 'scorched earth' policy. Within this zone, as well as within the area already infected, all breeding places of the mosquito must be eliminated or treated with Paris green or other larvicide.

"The whole region is being mapped from the air so that no pools, ponds or other collections of water will be overlooked. The adult mosquitoes are being sought and killed in the houses with insecticide sprays to diminish the chances of their laying eggs and thus perpetuating the species in the region.

"Every automobile and train that leaves the infested area is being stopped, inspected and fumigated. A maritime service has been organized at points along the coast to disinfect every boat or plane bound for clean ports.

"It is war in a very real and grim sense, and, unlike other types of war, its purpose is the preservation of human life."

Science News Letter, May 11, 1940

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SCIENCE NEWS LETTER

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Non-Cancerous Tumors Prevented by Male Hormone

ARTIFICIAL male sex hormone treatment has prevented the growth of non-cancerous breast tumors which occur in female animals, Dr. Francis Carter Wood, director of the Crocker Institute of Cancer Research of Columbia University, announced.

When the breast tumors were transplanted from one female rat to another, the tumors failed to grow in the second animal when testosterone, synthetic male sex hormone, was injected. Injections of female sex hormone or of pituitary gland hormone, on the other hand, caused growth of the breasts with changes very similar to cancer.

The growth of cells in the organs of an animal which determine its sex characteristics is stimulated by injection of the hormone corresponding to the animal's sex and retarded by injections of the hormone corresponding to the opposite sex, Dr. Wood said.

The question of whether or not hormone treatments can cause malignant growths is of practical significance because of the wide usage of skin ointments containing oestrin (female sex hormone), Dr. Wood says. "There are a number of cases in human beings where it is suspected that the appearance of cancer occurred after the use of these ointments and was due to the stimulating effect of the application.

"So far, however, there is no evidence that cancer has been produced by these hormone injections, though other students of the problem have claimed positive results. Although hyperplastic areas in the breast were produced in female rats by the injections of oestrin, no true malignant growths occurred. Small portions of the hyperplastic tissue were removed and grafted into other rats to determine whether a change into cancer had taken place but the results were negative.

"This is one aspect of the problem which the Institute is at present working on. One of the facts that has been definitely established is that the female sex hormone does stimulate the breast and should be used with great discretion in the treatment of human beings."

Science News Letter, May 11, 1940

An Italian chemist reports a process for obtaining *fuel* from the wild figs, prickly pears, and eucalyptus of Eritrea, East Africa.

BOOKS

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WILDLIFE

NATURE RAMBLINGS
by Frank Thone

Bird Control

BIRD control, the planned effort to maintain all species in the bird population in normal and natural relations to the environment, was explained before the recent North American Wildlife Conference held in Washington, D. C., by two scientists of the U. S. Biological Survey, E. R. Kalmbach and Johnson A. Neff.

To a great many people, especially those who are pestered in one way or another by "bad" birds like crows, bird control is summed up in just two words: "Kill 'em!" That would be an extreme over-simplification of the matter, in the view of the Biological Survey field men. Birds may be "bad" in one place and "good" in another, as the rice-devouring reed-bird of the South becomes the harmless and beloved bobolink in the North. Hence moderation and restraint are in order at all times, and especially the gathering of all possible information before judgment is pronounced.

In some regions, birds that are being anxiously cherished by the nation as a whole become at least local nuisances. Thus, near some of the western duck refuges the flocks of broadbills help themselves too freely to ripening sorghum and other crops from neighboring fields. Sometimes (though not always) this problem can be solved by arranging for crops that can be harvested before the ducks arrive. This also is a subject calling for more research — and much patience.

Science News Letter, May 11, 1940

Sixteen muscles control *facial expression,* and ten of them are in or around the mouth.

Remains of an *aqueduct* built by the Roman Emperor Claudius have been found by workmen near Naples.

ANTHROPOLOGY

New World's First Conquest Wars Were in Greenland

"IT is odd that the first wars of conquest in the New World were fought in Greenland between peoples noted outstandingly today for their peaceful traits — Eskimos and Norsemen."

So Henry B. Collins, Jr., of the Smithsonian Institution declared, speaking as retiring president of the Anthropological Society of Washington.

Ascribing to Greenland the key role in Eskimo history of providing the only dated site from the Eskimo's entire past, Mr. Collins said that the sequence of the Eskimos' ancient experience in America is being pieced together, working from that date. A rune stone near Inugsuk, Greenland, is taken to mean that Vikings were in the region near the end of the thirteenth century A.D. Digging near there, a few years ago, Dr. Therkel Mathiassen, Danish archaeologist, found clues to the conflict which ensued when Vikings encountered Greenland Eskimos in that era.

Excavations in Canada and Alaska have proved that the oldest Eskimos were established in Arctic Alaska, Mr. Collins said. Although five main stages of Eskimo culture can be distinguished there, it is not yet possible to count the centuries that Eskimos have inhabited the New World. Efforts to trace these people into Asia, where they lived before crossing Bering Strait to Alaska, are being made.

Oldest Eskimo art is significantly like that of the Old Stone Age, Mr. Collins has concluded. Eskimos did not engrave figures of animals with the skill of Europe's Cro-Magnon artists, who decorated cave walls 30,000 years ago. But the Eskimos used geometric designs in their ivory and bone articles strikingly similar to Old Stone Age designs.

This does not mean that the Eskimos using the designs lived as long ago as the cave artists, Mr. Collins emphasized. But Old Stone Age art ideas may have persisted and spread in widening circles, being carried far afield to the New World eventually by the wanderers who became America's Eskimos.

Science News Letter, May 11, 1940

PHYSIOLOGY

Sex Hormone Treatments Replacing Youth Operation

A MEDICAL Ponce de Leon, famous for originating widely discussed rejuvenation operations, now looks to sex hormones as science's closest approach to a fountain of youth.

Dr. Eugen Steinach, in his "first statement to the lay public" about his work, a book, *Sex and Life* (Viking), indicates that there is greater hope in medical treatment with synthetic sex chemicals than the sex gland transplantation experiments that made him famous.

This new viewpoint, resulting from the advance of medicine, is in accord with American experience. The famous physician of Vienna and Zurich reviews the development of his medical attempts at restoring youthful vigor to men past the prime of life.

The famous Steinach operation itself consists in ligating or tying off the spermatic duct, thus interrupting procreative activity and thereby increasing all secondary sex characteristics.

Reversal of sex in animals was secured by Dr. Steinach through sex gland transplantations. Success with this and other

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researches led to the rejuvenation operation.

Dr. Steinach's emphasis on sex hormone treatment is in line with the work of American medical scientists, many of whom have been extremely critical of the results claimed for his operation. Sex hormone treatment is now being used by a number of American doctors with good results not so much in rejuvenation of elderly people, but in stimulation of normal sex gland activity when this has been lacking in young people.

For the future, Dr. Steinach says his work points to a prospect of "no land of eternal youth, but one of bearable old age in which within natural limits the optimum physiological conditions of life prevail."

Science News Letter, May 11, 1940

GENETICS

Double Blessed Event More Likely For Older Fathers

IF YOU are an expectant father, your chances for having twins instead of one son or daughter are slightly greater with each year of your age, it is revealed by a statistical study conducted by the National Institute of Health and reported (*Human Biology*, Feb.) by Drs. J. Yerushalmy and S. E. Sheerar.

Older mothers are more likely to give birth to twins than are younger women. And twin births occur with much greater frequency in families already large than they do as first or second births.

But the fact that older fathers are more likely to have twins cannot be explained by the fact that older women are more likely to have older husbands. When only the births to young mothers are considered, there is still a considerable increase in the proportion of twin births to total deliveries with advancing age in the father.

The influence of age of mother and order of birth, although showing up clearly when all twin births are considered, seems to apply principally to the births of non-identical twins, those resulting from a double ovulation rather than the dividing of a single egg cell.

Mirror imaging in twins, the trick of nature that makes one twin look like the other's reflection with reversed handedness, hair whorl, and so on, is explained by Dr. H. H. Newman of the University of Chicago, in the same issue of Human Biology as being due to environmental rather than hereditary influences.

Such reversals, whether superficial ones like hair growth or fingerprint patterns, or even having the heart and other organs on the wrong side, are much more common in joined "Siamese" twins than in separate identical twins, and in joined twins occur much more frequently in the right-hand member. Joined twins are due, it has been found, to twinning so late in the development of the embryo, that production of two complete and separate individuals is impossible.

Mirror imagery often accompanies the occurrence of defects in development and is probably due, Dr. Newman concludes, to growth-depressing agents.

Science News Letter, May 11, 1940

CHEMISTRY

Derivative of Castor Oil Now Used in Fly Spray

ADD to castor oil's usefulness: a new fly spray is made from it. A derivative of castor oil is being used to replace part of the pyrethrum in commercial fly sprays. Large quantities of pyrethrum obtained from a species of chrysanthemum plant are used in suitable hydrocarbon oil bases as fly sprays. The most important of the chief sources of pyrethrum is Japan and the supply is adversely influenced by the war. Castor oil when subjected to heat is broken down into undecylenic acid, heptaldehyde and residues. The undecylenic acid is separated by distillation and treated with isobutylamine to form isobutyl undecylenamide. This, when used in combination with small amounts of pyrethrum in a suitable base oil, is an excellent fly spray, better than either pyrethrum alone in the base oil, or isobutyl undecylenamide alone.

Science News Letter, May 11, 1940

PHYSICS

Exiled Woman Scientist Continues Work on Uranium

OUT of war-threatened Stockholm comes the latest news on uranium fission—the amazing splitting of this heavy element by weak neutrons with the release of enormous amounts of atomic energy.

Reporting in the British scientific journal, *Nature* (March 16), is Dr. Lise Meitner, exiled German Jewish woman scientist, who first suggested to Prof. Otto Hahn in Berlin that his pioneer experiments really showed that uranium was split by neutron bombardment. Dr. Meitner, for years before the coming of Hitler to power in Germany, had been a close associate of Prof. Hahn in his researches.

At the Research Institute for Physics in Stockholm Dr. Meitner has been carrying out experiments on the capture "cross-sections" of atoms of lead, thorium and uranium exposed to the neutrons.

The problem of cross-sections is a vital one in nuclear physics for it helps to determine whether a bombarding particle like a neutron will be scattered by the nucleus or captured.

One may visualize "a capture cross-section" by a baseball analogy. The area over which a player, standing still, can catch a baseball thrown at him would be his "capture cross-section." All players would have different capture cross-sections for baseballs, just as the nuclei of atoms have different capture cross-sections for neutrons. This is a rough picture intended only to give a partial idea of the meaning of a cross-section as physicists use it.

Dr. Meitner says that the nucleus of

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lead atoms has a cross-section of 2.5 units of atomic cross-section area.

By comparison thorium has a cross-section over twice as large, or 6.0 units.

Finally, uranium with mass 238 (the kind that releases atomic energy) has a cross-section of 1.5 and is thus small by comparison, so that having neutrons hit uranium atoms and split them is no easy task.

The unit of atomic cross-section used is equal to 10^{-24} square centimeters, or 0.000,000,000,000,000,000,000,001 square centimeters.

Science News Letter, May 11, 1940

CHEMISTRY

Nylon, Rival of Silk, May Soon Compete with Wool

Versatile Synthetic Fiber Enters New Field With Process To Make It Heat-Insulating, Moth-Proof

NYLON, versatile synthetic fiber material which is now entering the fine hosiery field because of its silk-like qualities, may next tackle natural wool as a competitor.

A new patent, issued by the U. S. Patent Office, covers the production and processing of a crimped wool-like fiber made from nylon. The new patent is issued to John Blanchard Miles, Jr., scientist of E. I. du Pont de Nemours and Company, and is assigned to du Pont.

The new wool-like nylon is said to approach, "and may even equal" wool in its heat-insulating properties. Other claims of superiority include strength, heat stability, dyeing characteristics, elasticity, mothproofness and immunity to any harmful action by common cleaning fluids or processes.

E. K. Gladding, manager of the nylon division of du Pont, says there is no immediate commercial production planned for the new wool-like nylon fiber. Such production will require new types of manufacturing equipment, all of which must yet be designed and built.

The patent covers the conversion of filaments from synthetic linear condensation polymers, particularly polyamides, into wool-like fibers by mechanical methods of "crimping" either prior to, during, or following the "cold-drawing" process which is used in making nylon yarn. In general the patent states that at least four crimps to the inch are required to obtain a wool-like material.

The retention of the crimpy quality after the stretching that occurs in normal use is improved by hot water or steam setting treatments. The new fiber lends itself to the preparation of mixed fibers and its luster can be controlled in manufacture to improve its appearance.

Nylon is the chemical material which in fine filaments can be made into sheer, strong and water-repellent hosiery which will be on the market May 15. In thicker filaments it is being used for fish lines and leaders, and coarse bristles of nylon are appearing in toothbrushes. The application to a crimped wool-like fiber is the newest achievement of this versatile chemical material.

Science News Letter, May 11, 1940

ASTRONOMY

New Theory Shows Moon Once Part of South America

THOUSANDS of small glassy objects, called "tektites," discovered on the southwestern shores of the Pacific Ocean are important evidence that the moon was once a part of the earth, according to a theory advanced by Dr. Carl W. Rufus, of the University of Michigan astronomy department.

These tektites have been studied by scientists for more than 150 years, but there has never been a satisfactory theory for their origin.

Dr. Rufus' explanation of the phenomena is based largely upon the general "fission" theory of the origin of the moon, developed by Sir George Darwin, and which says that the Pacific Ocean is a scar on the earth—created when the moon was torn away 10,000 years ago by a powerful tidal force.

Some of the loose matter which was pulled away with the moon did not fall back immediately to earth, Dr. Rufus says, but rather continued to revolve out in space for some time. These particles, he believes, were similar in composition to the matter which is contained in Saturn's rings today, and are the same glassy "tektites" found in the Pacific area.

The composition of the primitive earth at the time of the moon's fission is not known today, but it is generally believed that the rupture occurred while the earth was beginning to solidify. According to Dr. Rufus' explanation, the earth was made up of an upper layer of hard granite with a lower layer of glassy basalt beneath the granite.

"When the fission occurred," the astronomer continues, "it seems very probable that the mass of the moon stripped the Pacific area of its granite layer and probably lifted some of the material from the glassy layer. The glassy part being deepest, it was the last to leave the earth and would therefore constitute the material which formed the detached fragments."

These particles were drawn into the earth's atmosphere at "speeds sufficient to produce the typical forms which are characteristic of tektites today."

Further evidence to support Dr. Rufus' contention is the series of large trenches on the floor of the Pacific Ocean, parallel to the area in which the tektites are found. These trenches are thought to extend deep into the glassy area.

Science News Letter, May 11, 1940

CONSERVATION

Trumpeter Swans Saved From Threatened Doom

See Front Cover

GRACEFUL white swans, that glide through many a popular song, almost lost one of their most beautiful native American species a few years ago. The trumpeter swan, once down to a doubtful score or so of birds, responded to the 1939 census with 199 specimens, with every hope of further increase. The bird shown on the front cover was photographed by a member of the U. S. Biological Survey on the Red Rocks Migratory Waterfowl Refuge in Montana. The entire trumpeter swan population of the world is concentrated there and in Yellowstone National Park.

Science News Letter, May 11, 1940

•First Glances at New Books

ASTRONOMY

TOTAL ECLIPSE OF THE SUN, October 1, 1940—Nautical Almanac Office—*Govt. Print. Off.*, 57 p., $1.50. (Supplement to the American Ephemeris, 1940.) All the astronomical data and maps on the coming total eclipse of the sun.

Science News Letter, May 11, 1940

PSYCHOLOGY

THE PLANS OF MEN—Leonard W. Doob—*Yale Univ. Press*, 411 p., $3. See page 297.

Science News Letter, May 11, 1940

MEDICINE

CHEMOTHERAPY AND SERUM THERAPY OF PNEUMONIA—Frederick T. Lord, Elliott S. Robinson and Roderick Heffron—*Commonwealth Fund*, 174 p., $1. This valuable handbook for the practicing physician summarizes latest knowledge of pneumonia treatment. Concise and practical information on treatment by either antiserum or sulfapyridine or a combination of the two is given. See also p. 296.

Science News Letter, May 11, 1940

MYTHOLOGY

HAWAIIAN MYTHOLOGY—Martha Beckwith—*Yale Univ. Press*, 575 p., $5. A great number of myths are published in this guide to Hawaii's native art of narrating legends. While the myths are the central feature of the book, the discussions are full enough to provide a rounded picture of the Hawaiian attitude toward nature, religion, and art.

Science News Letter, May 11, 1940

AGRICULTURE

YOUR CAREER IN AGRICULTURE—Homer Paul Andersen—*Dutton*, 285 p., $2. An inspirational book for boys who will become the farmers of the future. The author sanely points out general farming and dairying as agricultural mainstays, yet does not neglect the potential values in such special movements as chemurgy.

Science News Letter, May 11, 1940

PHYSIOLOGY

SEX AND LIFE — Eugen Steinach — *Viking*, 252 p., $3.75. See p. 301.

Science News Letter, May 11, 1940

HISTORY

WE CALLED THEM INDIANS—Flora Warren Seymour — *Appleton-Century*, 280 p., $2. Written for young readers, this book endeavors to give a more balanced view of Indians, past and present, than is gained from Hiawatha, Wild West tribes, or any other special group. Famous Indian names figure vividly in the account.

Science News Letter, May 11, 1940

MICROSCOPY

THE MICROSCOPE—R. M. Allen—*Van Nostrand*, 286 p., $3. Microscopes and their use, from the simplest student type to the heavy siege pieces used in advanced research, fully but simply and clearly explained, together with the essentials of optics, a little about the history of microscopes, and a great deal of useful information about modern microtechniques. A book that ought to be on the reference shelf right alongside the microscope case.

Science News Letter, May 11, 1940

HORTICULTURE

GARDENING FOR FUN IN CALIFORNIA—Jean-Marie Consigny and Charles Palmer—*George Palmer Putnam, Inc., Hollywood*, 249 p., $2.50. The problems of California home-grounds gardeners are quite different from those of gardeners in other parts of the country, so that this special book for their special needs will doubtless receive a most appreciative welcome. Bits of humor here and there add a filip to the solid values of the work—like having a frog in your lily pond.

Science News Letter, May 11, 1940

HORTICULTURE

BE YOUR OWN GARDENER — Sterling Patterson—*Harper*, 370 p., $2.50. All the information necessary for successful home gardening, from planning the layout to selection and care of things to be grown, compacted into one well-balanced book.

Science News Letter, May 11, 1940

BOTANY

BASIC COURSE IN BOTANY, The Foundations of Plant Science—Raymond J. Pool—*Ginn*, 654 p., $3.75. A standard course in botany for colleges, but old facts are so freshly and vigorously presented that they seem like new ones, and new facts bring the book strictly down to date. As might be expected from the author's personal background, ecological principles are presented with particular care.

Science News Letter, May 11, 1940

RADIO

HOW TO BECOME A RADIO AMATEUR—*American Radio Relay League*, 42 p., 25c.

Science News Letter, May 11, 1940

BIOGRAPHY—PSYCHOLOGY

ALFRED ADLER, A Biography—Phyllis Bottome—*Putnam's Sons*, 323 p., $3. Written by a novelist, this is a most readable account of the life of a great man.

Science News Letter, May 11, 1940

ARCHAEOLOGY

ROME AND ITALY OF THE EMPIRE (Economic Survey of Ancient Rome, Vol. V)—Tenney Frank—*Johns Hopkins Press*, 445 p.; GENERAL INDEX TO VOLS. I-V, 140 p., $5.75 for Vol. V and Index to Vols I-V. See p. 298.

Science News Letter, May 11, 1940

GEOGRAPHY—HISTORY

AN ATLAS-HISTORY OF THE SECOND GREAT WAR—J. F. Horrabin—*Knopf*, 99 p., $1.50. "War is essentially an affair of geography" says the author, and so he presents the present war in 51 very clear maps and diagrams plus brief factual comments.

Science News Letter, May 11, 1940

ETHNOLOGY

FIJIAN FRONTIER — Laura Thompson—*American Council, Institute of Pacific Relations*, 153 p., $2. An ethnological study written with a practical purpose: the hope that her analysis of current changes in native life may be useful to government officials, physicians, and educators who deal with the natives. The island thus analyzed is Kambara in eastern Fiji.

Science News Letter, May 11, 1940

HORTICULTURE

WALL SHRUBS AND HARDY CLIMBERS—W. J. Bean—*Macmillan*, 181 p., $2.25. A book covering a special aspect of gardening, to which adequate attention is as a rule not paid, either by authors or gardeners.

Science News Letter, May 11, 1940

ENGINEERING

INVESTIGATION OF OIL-FIRED FORCED-AIR FURNACE SYSTEMS IN THE RESEARCH RESIDENCE—Alonzo P. Kratz and Seichi Konzo—*Univ. of Illinois*, 90 p., 90c. (Engineering Experiment Station, Bulletin Series, No. 318.)

Science News Letter, May 11, 1940

ENTOMOLOGY

BEE-KEEPING FOR ALL—Tickner Edwardes—*Dutton*, 221 p., $1.75. Fifth edition of a standard book by a well-known English apiarist.

Science News Letter, May 11, 1940